

Bob Kahn's copy

Atari Logo PrinterPac

TURTLE GRAPHICS DUMP TO A PRINTER

- 1) Atari 1020 Printer/Plotter
- 2) Epson MX-80

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Plotting Turtle Graphics with the ATARI 1020 Plotter/Printer

The procedures in this section will enable you to print Logo turtle graphics and/or text to the screen and on the Atari 1020 Printer/Plotter at the same time. To do this correctly requires that a few points be observed:

1) All commands to the 1020 should be in a procedure. Optimum results will not be obtained in immediate mode.

2) Prior to running a procedure:

A) Only one printer should be turned on at a time. When using the plotter, turn off any other printer you may have connected.

B) Forward the paper two or three inches before drawing. This will prevent the paper from being sucked up into the printer while it's creating the drawing.

C) Do not make drawings in the WRAP mode; type WINDOW before running the procedure.

3) Certain steps must be taken in writing the procedures:

A) The first command of the procedure should be PLON; this opens the 1020 with a SETWRITE "P".

B) The second procedure needs to be PGRM if you want to print "turtle drawings." PGRM puts the plotter in the graphics mode.

C) After any command that makes the turtle move (such as FD, BK, SETX, HOME, etc.) PLOT should be used. PLOT is not necessary when the turtle's heading is only changed (such as RT or LT).

3) When using the Plotter in the text mode:

A) PLOT and PLOFF are used the same as in the graphics mode.

B) The procedures PL20, PL40, and PL80 are used to select print sizes. The 1020 always starts with 40 columns in text mode when the PLON command is given.

C) PLABEL prints text in one of four directions and one of 64 sizes.

D) PLNTYP selects between various sizes of solid and dotted lines. BARF is a non-existent procedure. It causes Logo to print an error message if improper inputs are given.

The following example procedure prints all the procedures in the workspace to the 1020 in 80 column format:

```
TO PRINT.PROCEDURES
PLON
PL80
POPS
PLOFF
END
```

DRAWING WITH COLORED PENS

The following three procedures - COLORED.SQUARES, 1020TREE, and XMAS.TREE - are examples for using the 1020 in the graphics mode.

A) PROCEDURES SHARED BY ALL THREE EXAMPLES:

- 1) These procedures enable the plotter to draw in the appropriate color.

```
TO PENBLACK
( TYPE CHAR 67 CHAR 48 )
END
```

```
TO PENBLUE
( TYPE CHAR 67 CHAR 49 )
END
```

```
TO PENRED
( TYPE CHAR 67 CHAR 51 )
END
```

```
TO PENGREEN
( TYPE CHAR 67 CHAR 50 )
END
```

- 2) These procedures set the screen turtles' pens to the same colors as the plotter's pens. Since PENBLACK is only used to print the procedures by the Plotter, we do not use it for the screen turtle.

```
TO SETPENS.GREEN
SETPN 2
SETPC 2 99
PENGREEN
END
```

```
TO SETPENS.BLUE
SETPN 1
SETPC 1 56
PENBLUE
END
```

```
TO SETPENS.RED
SETPN 0
SETPC 0 34
PENRED
END
```

- 3) The following are general procedures. If PRLIST is used, type the main procedure name in place of XXXX.

```
TO PRLIST
PLON
PGRM
PENBLACK
PLON REPEAT 4 [PR []]
PO [XXXX]
PLOFF
END
```

PRINTER.DEM

```

TO PGRM
( TYPE CHAR 27 CHAR 27 CHAR 7 )
( PR "M240,0\I\*M INT 1.5 * XCOR ", INT 1.5 * YCOR )
END

```

NOTE: In the above procedure the backslash "\" will be visible when typing in the program using the Logo editor but will not be visible when exiting the editor and printing the procedure to the screen or printer using the SETWRITE command. However, if the procedure is PO'd to the screen or SAVED "P: to the printer, the backslash will be visible.

PRINTER.DEM

```

TO PLON
SETWRITE "P:
END

```

```

TO PLOFF
SETWRITE []
END

```

```

TO PLOT
( PR IF PEN = "PD ["D] ["M] INT 1.5 * XCOR ", INT 1.5 * YCOR )
END

```

```

PHOME
PR "M0,0
END

```

B) **COLORED.SQUARES:** To create the procedure COLORED.SQUARES type all the above procedures plus these:

```

TO SQUARE
REPEAT 4 [FD 50 PLOT RT 90]
END

```

```

TO SQ
REPEAT 8 [SQUARE FD 30 PLOT RT 360 / 8]
END

```

SQUARES.PRT

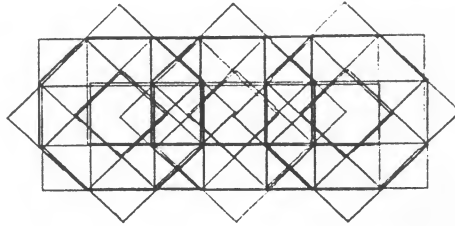
```

TO COLORED.SQUARES
PHOME
PLON
PGRM
SETPENS.GREEN
PLOT
SQ
PU LT 90 FD 50 PLOT
SETPENS.RED
PLOT
PD RT 90 SQ
PU LT 90 FD 50 PLOT
SETPENS.BLUE
PLOT
PD RT 90 SQ
PRLIST
PLOFF
END

```

To run the procedure, type:

WINDOW
COLORED.SQUARES



SQUARES.PRT

```
TO COLORED.SQUARES .  
PHOME  
PLON  
PGRM  
SETPENS.GREEN  
PLOT  
SQ  
PU LT 90 FD 50 PLOT  
SETPENS.RED  
PLOT  
PD RT 90 SQ  
PU LT 90 FD 50 PLOT  
SETPENS.BLUE  
PLOT  
PD RT 90 SQ  
PRLIST  
PLOFF  
END
```

C) **TREE1020**: To create the procedure 1020TREE type the following procedures found under A) PLON, PLOFF, PGRM, SETPENS.GREEN, PENGREEN (or whatever color you desire), and PLOT plus these:

```
TO TREE :SIZE :LIMIT
IF :SIZE < :LIMIT [STOP]
LT 45 FD :SIZE PLOT
TREE :SIZE * 0.61803 :LIMIT PLOT
BACK :SIZE PLOT
RT 90 FD :SIZE PLOT
TREE :SIZE * 0.61803 :LIMIT PLOT
BACK :SIZE PLOT
LT 45
END
```

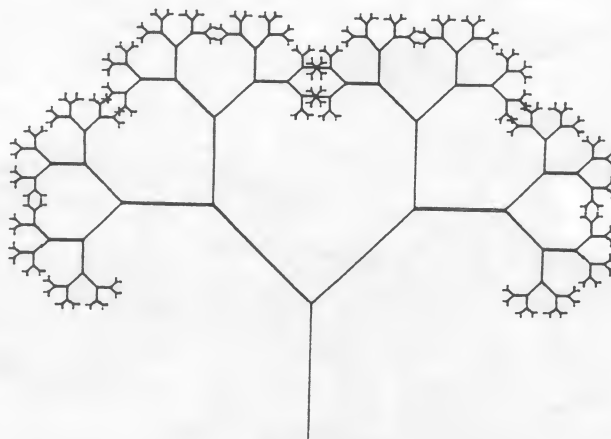
```
TO TREE1020 :SIZE :LIMIT
PLON
PGRM
SETPENS.GREEN
PLOT
TREE :SIZE :LIMIT
PLOT BK :SIZE PLOT
PU
PLOFF
END
```

Notice that this procedure does not print out the procedure as well as draw the drawing. If you choose to print out the procedure, enter the PRLIST procedure from A) and in the procedure TREE1020 replace PU with PRLIST.

The parameter SIZE refers to the size of the first branch. You may experiment with this. 64 will fill the screen. The parameter LIMIT sets the number of branchings at each major joint. A 2 here will create a tree that looks like parsley. The 0.61803 factor may be altered, also. It is the ratio of the length of each successive branch to the previous one.

An example of one way to run this procedure is:

```
WINDOW
TREE1020 64 2
```



TREE1020.PRT

D) **XMASTREE**: To create the procedure XMASTREE type the following procedures found under A) PLON, PGRM, SETPENS.GREEN, PENGREEN, PENBLACK, PLOT, PRLIST, PHOME and PLOFF plus these:

```
TO TREE
LT 90 FD 60 PLOT
REPEAT 5 [RT 135 FD 25 PLOT LT 135 FD 10 PLOT]
RT 135 FD 25 PLOT
RT 90
REPEAT 6 [FD 25 PLOT RT 135 FD 10 PLOT LT 135]
RT 135 FD 55 PLOT
END
```

```
TO TRUNK
REPEAT 2 [LT 90 FD 30 PLOT LT 90 FD 15 PLOT]
END
```

```
TO XMASTREE
PHOME
PLON
PGRM
SETPENS.GREEN
PLOT
TREE
PENBLACK
PLOT
TRUNK
PRLIST
PLOFF
END
```

To run this procedure simply type

```
WINDOW
XMASTREE
```



```
TO XMAS.TREE
PHOME
PLON
PGRM
SETPENS.GREEN
PLOT
TREE
PENBLACK
PLOT
TRUNK
PRLIST
PLOFF
END
```

XMASTREE.PR

ADDITIONAL PROCEDURES

1) PHOME: this procedure is used to move the Plotter pen without leaving a trail, as in HOME on the screen.

```
TO PHOME
PR "M0,0
END
```

Here is an example, drawing three variations of the procedure SQUIRAL one on top of the other, in different pen colors.

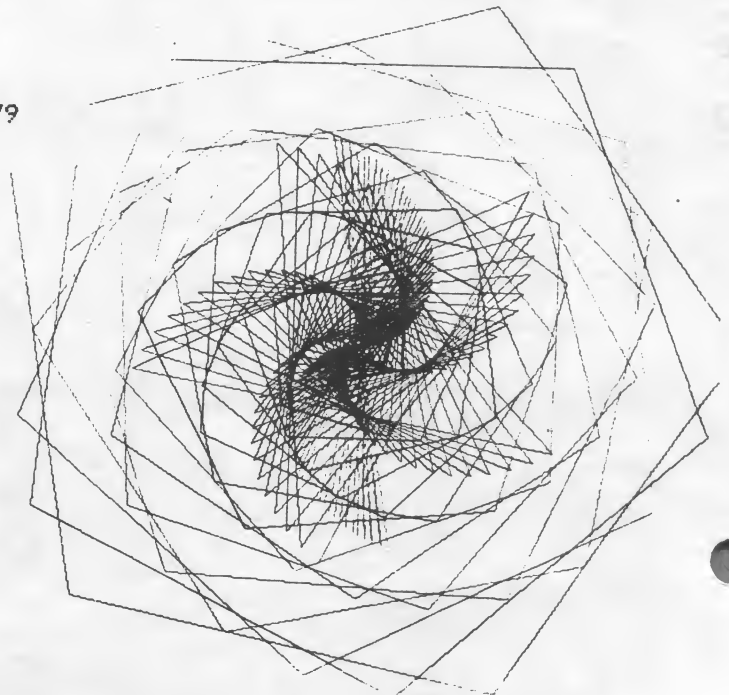
Begin by typing in the following procedures found in A) PLON, PGRM, SETPENS.RED, PENRED, SETPENS.BLUE, PENBLUE, SETPENS.GREEN, PENGREEN, PLOT, PLOFF, and the above procedure PHOME. Add to this the following:

```
TO SQUIRAL :ANGLE
MAKE "SIDE 0
REPEAT 100 [FD :SIDE PLOT RT :ANGLE MAKE "SIDE :SIDE +
2]
END
```

```
TO DESIGNS
PLON
PGRM
SETPENS.RED
PLOT
SQUIRAL 69
HOME
PU PHOME PLOT
SETPENS.BLUE
PLOT
PD RT 90 SQUIRAL 143
HOME
PU PHOME PLOT
SETPENS.GREEN
PLOT
PD RT 90 SQUIRAL 179
PU
PLOFF
END
```

To create this example, type:

```
WINDOW
DESIGNS
```



DESIGNS.PRT

3) DIFFERENT WRITING STYLES: To change the size of type on a text use the following procedures:

TO PL80
(TYPE CHAR 27 CHAR 27 CHAR 19)
END

TO PL40
(TYPE CHAR 27 CHAR 27 CHAR 14)
END

TO PL20
(TYPE CHAR 27 CHAR 27 CHAR 16)
END

The "80" refers to small type (80 columns) and the 20 to large type (20 columns). The 1020 will automatically print 40 columns unless told to do otherwise.

TO PRLIST,80 :PNAME
PLON
PL80
PO :PNAME
PLOFF
END

TO PRLIST,20 :PNAME
PLON
PL20
PO :PNAME
PLOFF
END

TO COLORED, SQUARES
PLON
PGRN
SETPENS, GREEN
PLOT
SQ
PU LT 99 FD 50 PLOT
SETPENS, RED
PLOT
PD RT 99 SQ
PU LT 99 FD 50 PLOT
SETPENS, BLUE
PLOT
PD RT 99 SQ
PRLIST
PLOFF
END

TO SETPENS, GREEN
SETPN 2
SETPC 2 99
PENGREEN
END

TO SETPENS, GREEN
SETPN 2
SETPC 2 99
PENGREEN
END

RTESIZE:RT

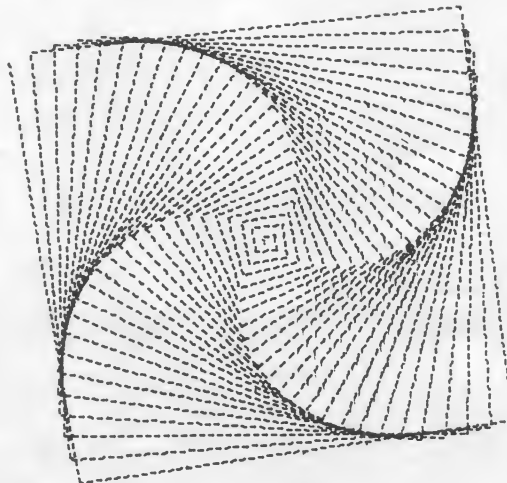
2) PLNTYP: as described on the first page of this DEMOPAC, this procedure selects between various sizes of solid and dotted lines, between 0 (dots) to 15 (broken lines). Here is an example using SQUIRAL. Type in the following procedures under A) PLON, PGRM, PLOT, PLOFF SETPENS.BLUE, PENBLUE (or whatever color) and PHOME and SQUIRAL from the previous page. Then type these:

```
TO PLNTYP :TYP
IF OR ( :TYP < 0 ) ( :TYP > 15 ) [BARF]
( PR "L INT :TYP )
END
```

```
TO SQUIRAL.PLN :SIZE :TYP
PHOME
PLOT
PD
PLON
PGRM
PLOT
SETPENS.BLUE
PLOT
PLNTYP :TYP
PLOT
SQUIRAL :SIZE
PLOT
PLOFF
END
```

To create this example, type:

```
WINDOW
SQUIRAL.PLN 89 3
```



SQUIRAL.PLN

4) PLABEL: This procedure is used to change the direction or size of print (other than the 20, 40 or 80 column sizes). The text can be printed vertically or horizontally in four directions. The variable ANGL can vary from 0 to 3, corresponding to the four directions of the compas (0 = west, 1 = south, 2 = east and 3 = north).

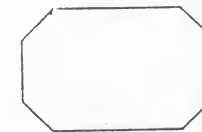
The variable SIZE can be a number from 0 to 64. Here is the basic procedure:

```
TO PLABEL :ANGL :SIZE :LIST
IF NOT MEMBERP :ANGL [0 1 2 3] [BARF]
( PR "Q :ANGL " * "S INT :SIZE " * "P :LIST )
( PR "M INT 1.5 * XCOR ", INT 1.5 * YCOR )
END
```

Although this procedure is used to print text it is a graphics operation, and PGRM must be used, as in printing graphics. Here are two examples:

```
TO WRITESIZE :SIZE :NAME
PLON
PGRM
PLABEL 1 :SIZE :NAME
PLOFF
END
```

The example to the right was done by typing WRITESIZE 20 "LOGO.



```
TO WRITEX :NAME
PLON
PGRM
PLABEL 0 5 :NAME
PENRED PGRM PLABEL 1 5 :NAME
PENBLUE PGRM PLABEL 2 5 :NAME
PENGREEN PGRM PLABEL 3 5 :NAME
PLOFF
END
```

This example was created by typing WRITEX "LOGO.

0907
LOGO
LOGO

WRITE.DEM

SCREENDUMP TO EPSON GRAPHICS PRINTER (MX-80)

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Note: This program will be published in a forthcoming book of Logo projects by the Atari Cambridge Research Laboratory. It is provided for your personal use and not for publication.

Create your turtle drawings in the usual way, then type EPSON to copy the graphics screen to the printer (Epson MX-80 only). The full graphics screen is printed to the printer, even if your display screen is in the split screen or text screen mode.

```
TO EPSON
SETWRITE "P:
TYPE CHAR 27
TYPE "A
TYPE CHAR 6
EPLINES 16384 48
TYPE CHAR 27
PR "@"
SETWRITE []
END
```

```
TO EPLINES :LOC :NUM
IF :NUM = 0 [STOP]
EPLINE :LOC 40 0
PR []
EPLINES :LOC + 80 :NUM - 1
END
```

```
TO EPLINE :LOC :BYTES :SPACE
IF :BYTES < 3 [EPBYTE 65536 * .EXAMINE :LOC 65536 * .EXAMINE :LOC + 40 STOP]
EPBYTE EXAM3 :LOC EXAM3 :LOC + 40
EPLINE :LOC + 3 :BYTES - 3 :SPACE
END
```

```
TO EPBYTE :BYTE1 :BYTE2
IF AND :BYTE1 = 0 :BYTE2 = 0 [MAKE "SPACE :SPACE + 1 STOP]
REPEAT :SPACE [TYPE "\ \ \ \ ]
MAKE "SPACE 0
TYPE CHAR 27
TYPE "K
TYPE CHAR 24
TYPE CHAR 0
EPBYTE1 :BYTE1 :BYTE2 4194304
END
```

```
TO EPBYTE1 :BYTE1 :BYTE2 :POS
TYPE2 CHAR (IF :BYTE1 > (:POS-1)[56][0]) + (IF :BYTE1 > (:POS - 1)[71][0])
IF :POS = 1 [STOP]
EPBYTE1 REMAINDER :BYTE1 :POS REMAINDER :BYTE2 :POS :POS/4
END
```

```
TO EXAM3 :LOC
OP65536 * (.EXAMINE :LOC) + 256 * (.EXAMINE :LOC + 1) + .EXAMINE :LOC + 2
END
```

```
TO TYPE2 :CHAR
TYPE :CHAR
TYPE :CHAR
END
```

EPSON.DEM